TRADE Raypa®

R.ESPINAR, S.L.

QMS-Quality Management Systems
REGISTERED FIRM
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EN ISO 9001
Nº Reg.: ESP 2429

INSTRUCTION MANUAL FOR USE AND MAINTENANCE

AUTOCLAVES FOR STERILIZATION

"MICROPROCESSOR CONTROLLED WITH DRY AND PREVACUUM"

Models: AE-28 DRY
AE-75 DRY
AE-110 DRY
AE-150 DRY

⚠ **This manual has been written for safety reasons, read the instructions carefully before installing and /or using this apparatus.**

If this apparatus should be sold or transferred, ensure that this manual is given to the new owner, for the correct use and installation.

This manual should be kept by the apparatus for in case of doubt in its use and for maintenance reasons.

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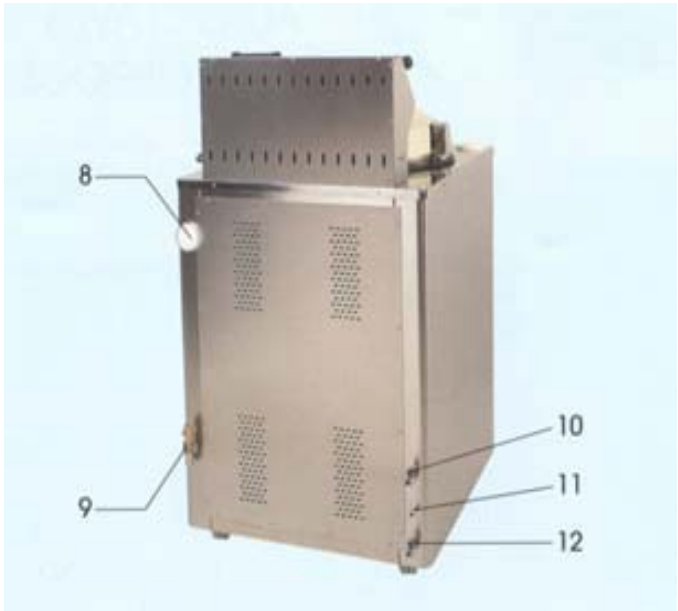
DESCRIPTION

1.- Interface outlet RS-232.
2.- Microprocessor.
3.- Mains switch.
4.- Mano-vacuometre.
5.- Thermal printer of continuous sheet.
6.- Thermal protector of the cover.
7.- Filling of the condensed water tank.

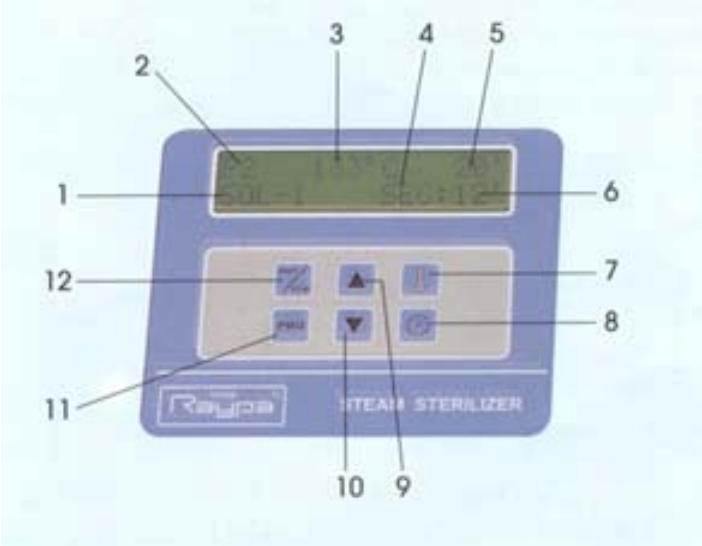
REAR VIEW



8.- Ventilation bacteriological filter.
9.- Safety valve.
10.- Condensed water tank empty valve.
11.- Condensed tank outlet.
12.- Valve for autoclave chamber empty.

MICROPROCESSOR FUNCTIONS AND CHARACTERISTICS

DESCRIPTION



1.- Operation mode: SOLIDS/LIQUIDS.

2.- Number of the program.

3.- Sterilization temperature.

4.- Final drying.

5.- Sterilization time.

6.- Dry time.

7.- Switch for sterilization temperature selection. (TEMPERATURE)

This switch is used during a sterilization program edition to select and edit the figures.

8.- Switch for sterilization time selection. (CLOCK)

This switch is used during the edition of a sterilization program to select and edit different figures.

- Time of sterilization.
- Type of sterilization.
- Dry time.
- Date/Hour.

9.- Increase switch.

In program mode it is used to increase the value of the parameter in edition.

Out of program it is also used to select a program.

10.- Decrease switch.

In program mode it is used to decrease the value of the parameter in edition.

Out of program it is also used to select a program.

11.- Programming switch. (PRO)

While pressing this switch during 2 seconds you can access to the edition of the program. During the process of sterilization will shoe the program while pressing.

12.- Start/Stop switch.

This switch is used to run or to stop the sterilization program selected.

To stop the sterilization cycle it must be pressed the START/STOP switch during 2 seconds. If this operation is made, in the final onform will appear the message “STOP” instead of the message “STERILIZATION OK”.

TECHNICAL SPECIFICATION

Apparatus:	Steam sterilization autoclave
Sterilization temperature:	From 105ºC to 139ºC.
Max. pressure:	2,5 bar
Voltage:	220 V single-phase (for AE-28 DRY and AE-75 DRY) 220 V or 380 V triple phase + N (for AE-110 DRY and AE-150 DRY)
Frequency:	50/60 Hz
Consume:	2.000 W (Model AE-28 DRY) 3.000 W (Model AE-75 DRY) 4.500 W (Model AE-110 DRY) 6.000 W (Model AE-150 DRY)
Sterilization time:	from 3 to 120 minutes.
Final Drying:	Selectable: (DRY/NOT DRY)
Drying time:	From 0/3 to 60 minutes.
Data printing:	Manual.
Printing cadence:	Every 120 seconds.
Printer connection:	Interface RS-232

CHARACTERISTICS

- Tank, rotary seal and lid made of stainless steel AISI 316.
- Exterior metallic and top surface made of AISI-304 stainless steel.
- Seal of silicone.
- Automatic air purge evacuation by initial pre-vacuum.
- Distilled water tank , with maximum and minimum water levels.
- Drying system with dry heat and vacuum pump.
- Automatic water filled in the sterilization chamber.
- Over-temperature and over-pressure safety devices, safety presostate and safety valve.

ACCESSORIES

ACCESSORIES THAT MUST BE INSTALLED AT THE FACTORY:

Code	Ref.	Description
90131400	PT-2	Heart probe PT-100, hermetic with flexible wire of silicone to introduce it into the liquids or bags to sterilize at a real time and temperature, not depending on the volume or capacity of the material to sterilize.
90131300	IT	Thermal printer of continuous sheet, that prints the number of the program, number of cycle, temperature, time and date of every sterilization.

Other accessories:

Code	Ref.	Description
90130228	CI-28	Perforated stainless steel basket AISI-316 of Ø280x200mm for AES-28. (2 per autoclave)
90130375	CI-75	Perforated stainless steel basket AISI-316 of Ø380x260mm for AES-75 and for AES-110. (2 per autoclave AES-75 and 3 per AES-110)
90130450	CI-150	Perforated stainless steel basket AISI-316 of Ø475x360mm for AES-150. (2 per autoclave)
90130628	CCI-28	Non-perforated stainless steel basket AISI-316 of Ø280x200mm for AES-28. (2 per autoclave)

Code	Ref.	Description
90130775	CCI-75	Non-perforated stainless steel basket AISI-316 of Ø380x260mm for AES-75 and AES-110. (2 per autoclave AES-75 and 3 per AES-110)
90130850	CCI-150	Non-perforated stainless steel basket AISI-316 of Ø475x360mm for AES-150. (2 per autoclave)
90130740	CEP-7040	Pippete sterilize cylinder of Ø70x400mm
90131340	CEP-1340	Pippete sterilize cylinder of Ø130x400mm
90131326	CEP-1326	Petri capsules sterilize cylinder of Ø130x260mm
90131347	CEP-1347	Petri capsules sterilize cylinder of Ø130x400mm
90131428	SRA-1	Height adjustable support with shelves for AE/AES-28
90131475	SRA-2	Height adjustable support with shelves for AE/AES-75
90131510	SRA-3	Height adjustable support with shelves for AE/AES-110
90131550	SRA-4	Height adjustable support with shelves for AE/AES-150

All accessories must be installed in factory

⚠ INSTALLATION

Install the apparatus on a stable and solid surface.

Don't install the autoclave in areas where there is danger of fire or explosion.

Don't block or cover the rear ventilation grid.

Connect a flexible tube to the rear outlet (11) for drainage.

CONNECTION TO THE MAINS

There is the characteristics plate situated at the rear, indicating the voltage and power. Check to make sure that your electrical installations have the same conditions.

The plug of the oven is a SCHUKO with central and lateral connection, for security reasons the oven must be installed to ground.

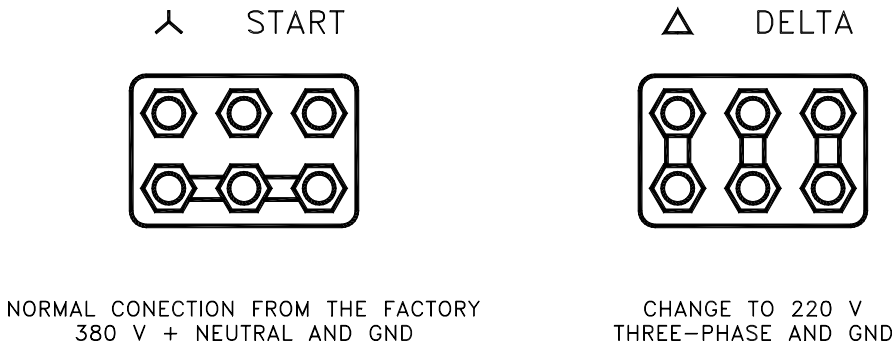
The triphasic autoclaves (AE-110 DRY and AE-150 DRY) have a normalized plug of 16A, 3 poles, neutral and ground.

The autoclaves are equipped from the factory to be connected at 380V+N and ground, but they can be changed into triphasic 220V and ground following the instructions given in CHANGE OF VOLTAGE.

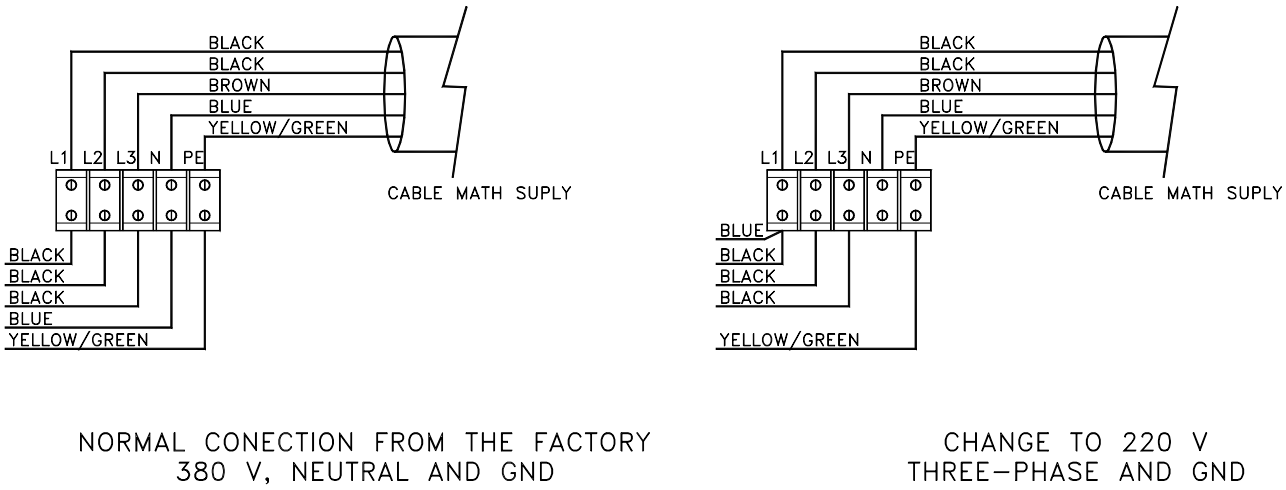
CHANGING VOLTAGE

To change voltage into 220V triple phase and ground follow the next steps:

- Disconnect the autoclave from the mains
- Take off the back cover of the autoclave
- Change the metallic bridges on the binding post from the star connection to a delta connection, as indicates below



- Take out the neutral (blue) from terminal space of main entrance, and connect to black wire L1.



To connect to the net-work, with out changing, use the 3 pole, neutral and ground plug. Leave the neutral binding post out of use.

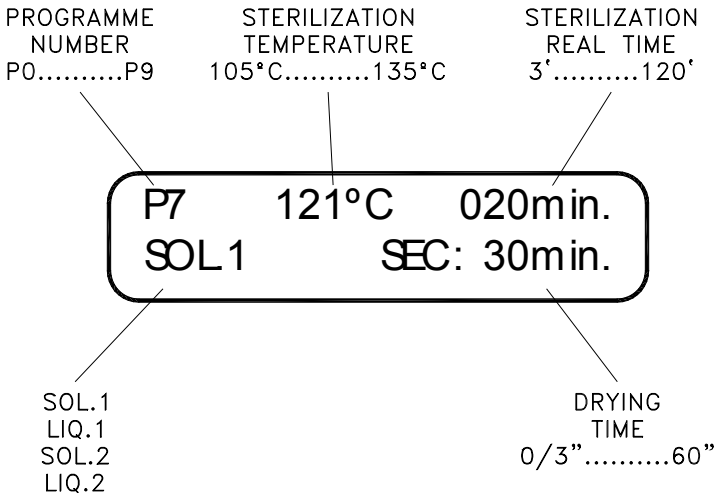
PROGRAMMING MODE

The microprocessor of this autoclave has 10 programs, numbers from P0 to P9. First 4, from P0 to P3, are protected programs and they come programmed from the factory with the usual parameters for sterilization.
These pre-set programs are:

Prog. Nº	Temp. (°C)	Press (bar)	Ster, time. (minutes)	Ster. Mode	Drying time minutes
P0	115	0,6	60	Solids	12
P1	121	1,1	30	Solids	25
P2	133	2,1	20	Solids	30
P3	121	1,1	20	Liquids	-

This programs cannot be modified, in case of modification protect or unprotect more numbers of programs. See the programs protected.
To edit different sterilization programs , use the programs between p4-p9 both included.

ALPHANUMERIC DISPLAY FUNCTIONS



The alphanumeric screen apart from showing the sterilization parameters, also shows a warning, failure and other messages. See WARNING MESSAGES and FAILURE MESSAGES.

PROGRAM INTRODUCTION

To edit data of a program is necessary to start from an initial situation of controller shown and follow the next steps:

- Connect the autoclave to the mains, and press the main switch (3) position I and at the same time will light.
- The microprocessor screen will show the message: “RAYPA STEAM STERILIZER” during 2 seconds.

When the autoclave is running for the first time, the screen will show in the first line the nº of the program, the temperature of sterilization and the sterilization time, in the second line of the message: “LACK OF WATER”, because it is not filled yet the distilled water condensed tank. See START UP.

When is going to be edited a program, the message “LACK OF WATER” and will appear the parameters left to complete the rest of the program.

- Select with the buttons (9) “INCREASE” and (10) “DECREASE”, the number of the desired program.
- Press the switch nº (11) “PRO” during 2 seconds to get into the program editor desired, and it will be shown the letter “P” to indicate the edition situation.
- Press the switch nº (7) “THERMOMETER” to edit the sterilization data.
- Pressing the switch nº (8) “CLOCK” will be selected the time of sterilization or the field SOL/LIQ, corresponding at all kinds of sterilization to realize, or also the field SEC, which corresponds to the dry time.
- Once the field to edit is set, use “Increase” and “Decrease” switches to modify the values of edition.
- To validate the modified data, press “PRO” switch, finishing the program edition.
- If it is needed to go out from the program without validating the modifications done, press the “START” switch that is used as an exit switch of the program, the controller goes back to the normal situation without validating any change in edition.
- Switches “INCREASE” and “DECREASE”, make no effect over the edition data, if the selected program is protected.
- Have in mind that:

  ▪ If the program is for liquids, field SEC will not exist, and for this reason will be modified.

  ▪ If SEC is equal to “0”, out of the program edition this field will not appear.

DATE AND HOUR ADJUST

Starting from the initial position of view, maintain pressed during 5 seconds the switch “CLOCK”, and the year will be lighting , pressing some times the switch “PRO” we will have access to the other parameters (month, day, hour and minute).

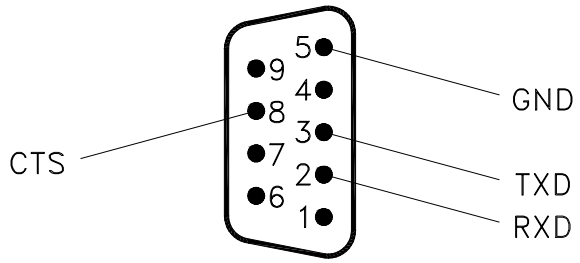
To modify the parameter to edit, press switches “increase/decrease”. Go out from the configuration by pressing switch “PRO”.

To visualize date and hour, just press the switch “PRO”.

PROGRAMMING OF PRINTER CONNECTION

The autoclave is provided with a lateral connector (1) of 9 pins., for printer connection.

The printer which is connected, will be of 24 columns and must have a RS-232 interface at 9.600 bps, 8 bits without parity and 1 bit of stop. It also must have a minimum buffer of 150 characters.



9 PINS CONNECTOR

If a printer is connected, see paragraph: PRINTER MODE.

SOLID/LIQUID MODE

If the autoclave is not equipped with an accessory code number: 90131400, reference: PT-2 (Heart probe), when a program is edited it will be set: SOL-1 to sterilize solids(glass, plastic, etc) and it will be set :LIQ-1 to sterilize a liquid (culture media).

If the autoclave has not the accessory (Heart probe) and it is set by mistake SOL-2 or LIQ-2, when the sterilization cycle initialise, the program will be aborted and it will appear the message: “PROBE 2 FAILURE”.

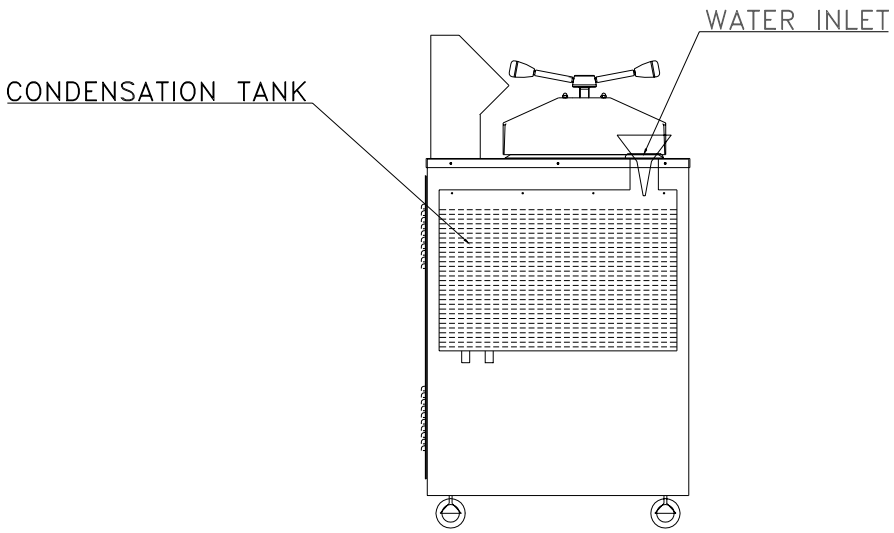
On the other case, if the autoclave has this accessory (Heart probe), it can be editable SOL-1/SOL-2 and LIQ-1/LIQ-2, depending on the usage of the device.

With the heart probe installed in the autoclave, we can introduce it inside a liquid or in the middle of a residues bag, according to that the 1 probe controls and maintains the

sterilisation temperature selected, the 2 probe, (heart probe) controls the real temperature of the liquid to sterilize, and until this liquid has not reached the selected temperature will not count the time of sterilization. For this reason it can be possible to sterilize a product in time and real temperature without mass or volume dependence.

START UP INSTRUCTIONS

Before starting up the autoclave, check inside if there are residues left (plastic, paper, etc.)
Connect the autoclave to the mains and switch the main button (3) to the position I.
At the microprocessor screen will appear the message: “RAYPA STEAM STERILIZER” and a few seconds later will appear a number of a program (it will always be the last program executed), and the message: “LACK OF WATER”



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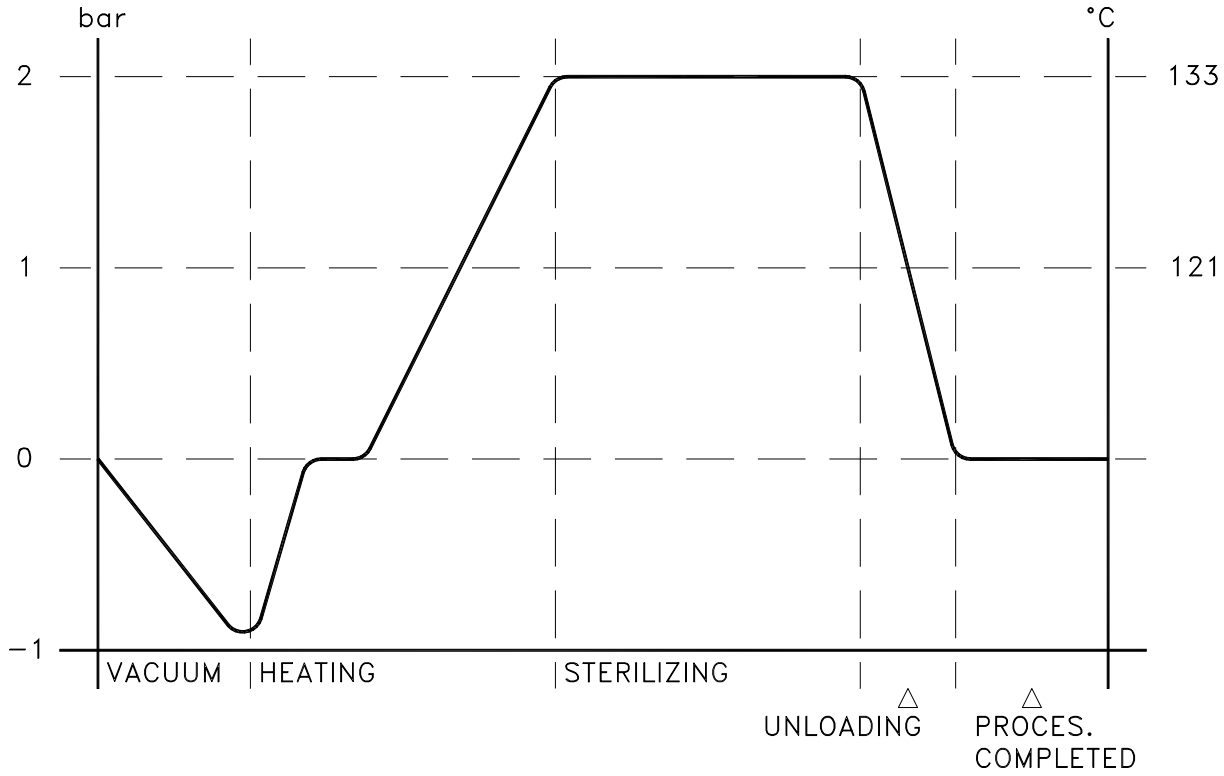
FILLING OF THE CONDENSATION TANK

Unscrew the cap of the water inlet (7).
Fill in the condensation tank with distilled water to the maximum level, until the message of the screen disappears and you hear the acoustic signal. Put the cap again without tighten it.
Open the lid.
Introduce the material. (See LOADING THE AUTOCLAVE).
The water to be used must have a minimum conductivity of 3.3 µS/cm (maximum resistivity 0.3 MΩ/cm). If the value is lower, the level sensors may not work due to the low conductivity of the water. In this case, and if there are not other means, mix a glass of tab water with the distilled water and it will give conductivity to the water.
Close the lid of the autoclave by means of tighten the closure.

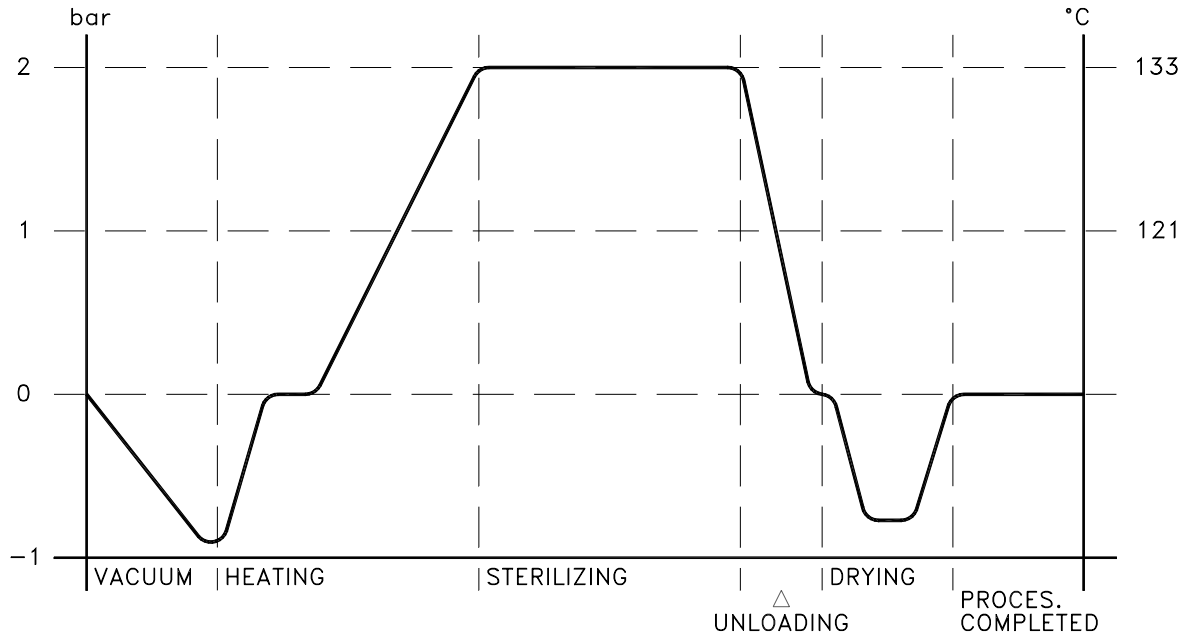
Select the appropriate program, press “START/STOP” switch, initializing the process of sterilization.

The microprocessor screen will keep you informed of every step of the process.

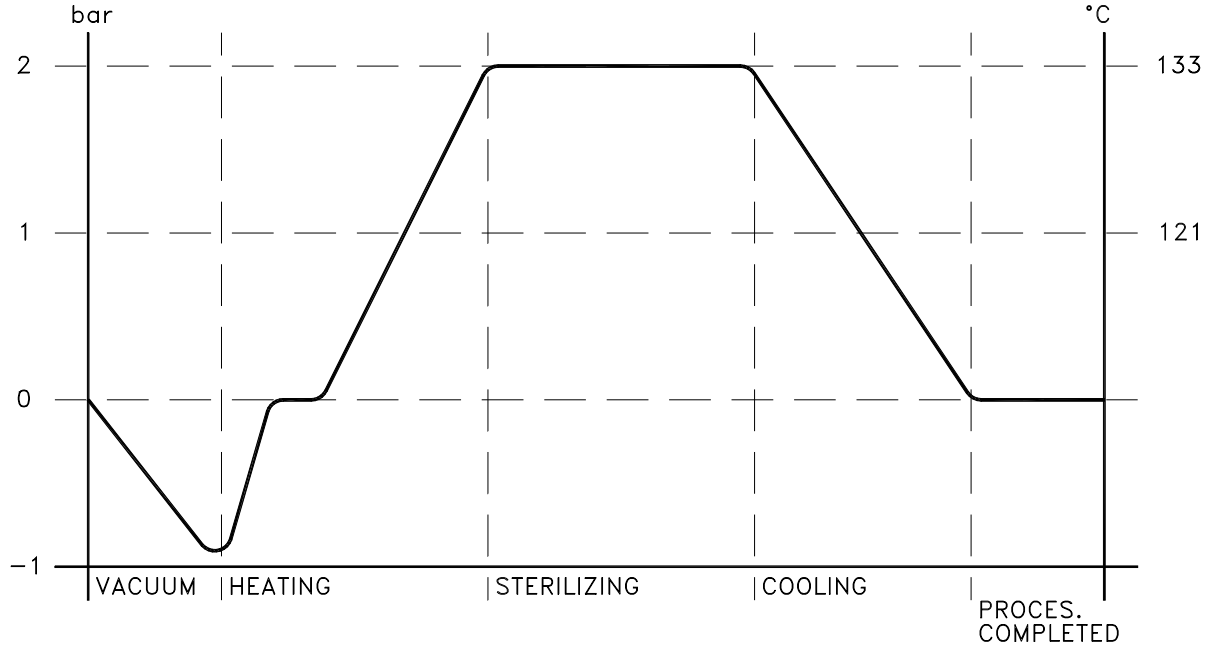
The sterilization cycle of a solid without dry is composed by the following phases:



The sterilization cycle of a solid with dry is composed by the following phases:



The sterilization cycle of a liquid is composed by the following phases:



VACUUM:	Initial vacuum, air expulsion of the sterilization chamber.
FILLING:	Automatic filled of distilled water in the sterilization chamber.
HEATING:	Increase of pressure, heating.
UNLOADING:	Automatic unload of the water and steam of the chamber to the condensed water tank. (only in solid program).
DRYING:	Baric balance and drying vacuum. (only in solid program).
COOLING:	Natural cooling process, after the sterilization period and up to 90ºC. (only liquid program).
PROCESS COMPLETED:	End of cycle signal.

At the end of the sterilization cycle (END OF PROCESS) sounds an acoustic signal. To come back to the initial screen just press switch “START/STOP”.

After the acoustic signal of “END OF PROCESS”, and if the cycle done is with dry, the sterilization chamber has vacuum yet that is shown on the manovacuometre (4). Depending on the autoclave's model, it still needs some time to re-establish the atmospheric temperature, it could be 10 minutes in models of 150l.

Do not try to open the lid while the manovacuometre (4) is not showing ±0.

Once the manovacuometre shows ±0, open the lid and keep it opened for a couple of minutes before taking out the material.

DO NOT INITIALIZE ANOTHER CYCLE OF STERILIZATION BEFORE HAS PASSED 15 MINUTES, FROM THE LAST CYCLE, LET THE LID OPEN DURING THIS TIME.

If the cycle done before was of liquids, in the screen will be possible to read: “WATER IN CHAMBER” alternatively with “START TO CONTINUE” (See “ADVISE MESSAGES”.

DO NOT OPEN THE AUTOCLAVE UNTIL THE CYCLE OF STERILIZATION IS FINISHED AND THE MANOMETRE SHOWS 0.

SHUT DOWN THE OF AUTOCLAVE.

To switch off the autoclave press the general switch (3) position 0. When you start up the autoclave again this will always show the last program selected.

⚠ LOADING THE AUTOCLAVE

Place the material to be sterilized directly or in baskets, in a way that you leave space the steam to circulate freely.

Take care not to cover the opening at the top of the autoclave.

If special bags are used, make sure that they don’t touch the walls of the autoclave because when using a drying cycle they might burn.

We also recommend that the bags should be placed side plastic face down in baskets because if placed paper side down they will absorb the condensation from the baskets.

PRINTER MODE

The microprocessor comes out from the factory with the configuration of manual printer.

To make possible printing a sterilization inform, if the printer has a switch called “PRINT”, will only have to press it.

To print an inform manually from the microprocessor:

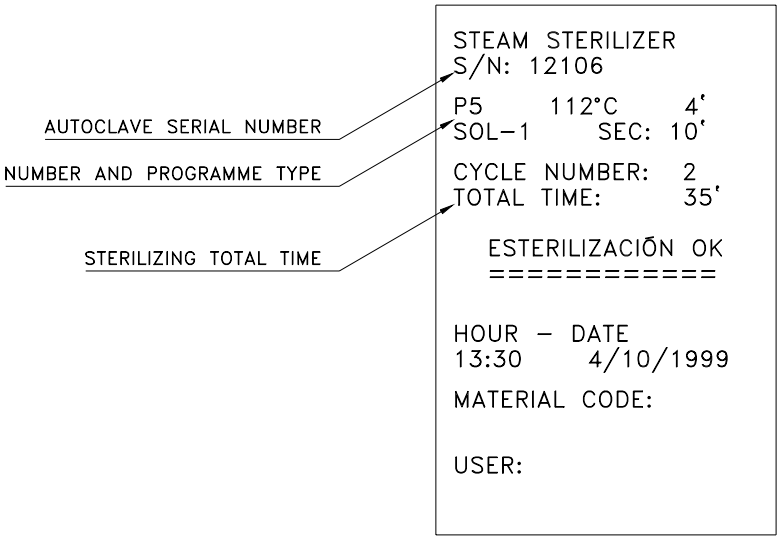
1.- Keep pressed switch “TEMPERATURE” (7), during some seconds, in the screen will appear the message :”MANUAL PRINTING”.

2.- Press the switch (11) “PRO”, in the screen will appear: “PRINT NOW? NO”.

3.- Press the switch (9) “INCREASE”, in the screen will appear: “PRINT NOW? YES”

4.- Press the switch (11) “PRO” in the screen will appear: “PRINTING”, and it will give us an inform of the last sterilization without data, as the following example:

DATA PRINTING RESULTS



In automatic printing mode, data concerning to temperature is suitable, step of the cycle, and also the time of every step lasted and a final inform.

To set the automatic printing:

1.- Keep pressed the switch (7) “TEMPERATURE” during some seconds, in the screen will appear the message: “MANUAL PRINTING”.

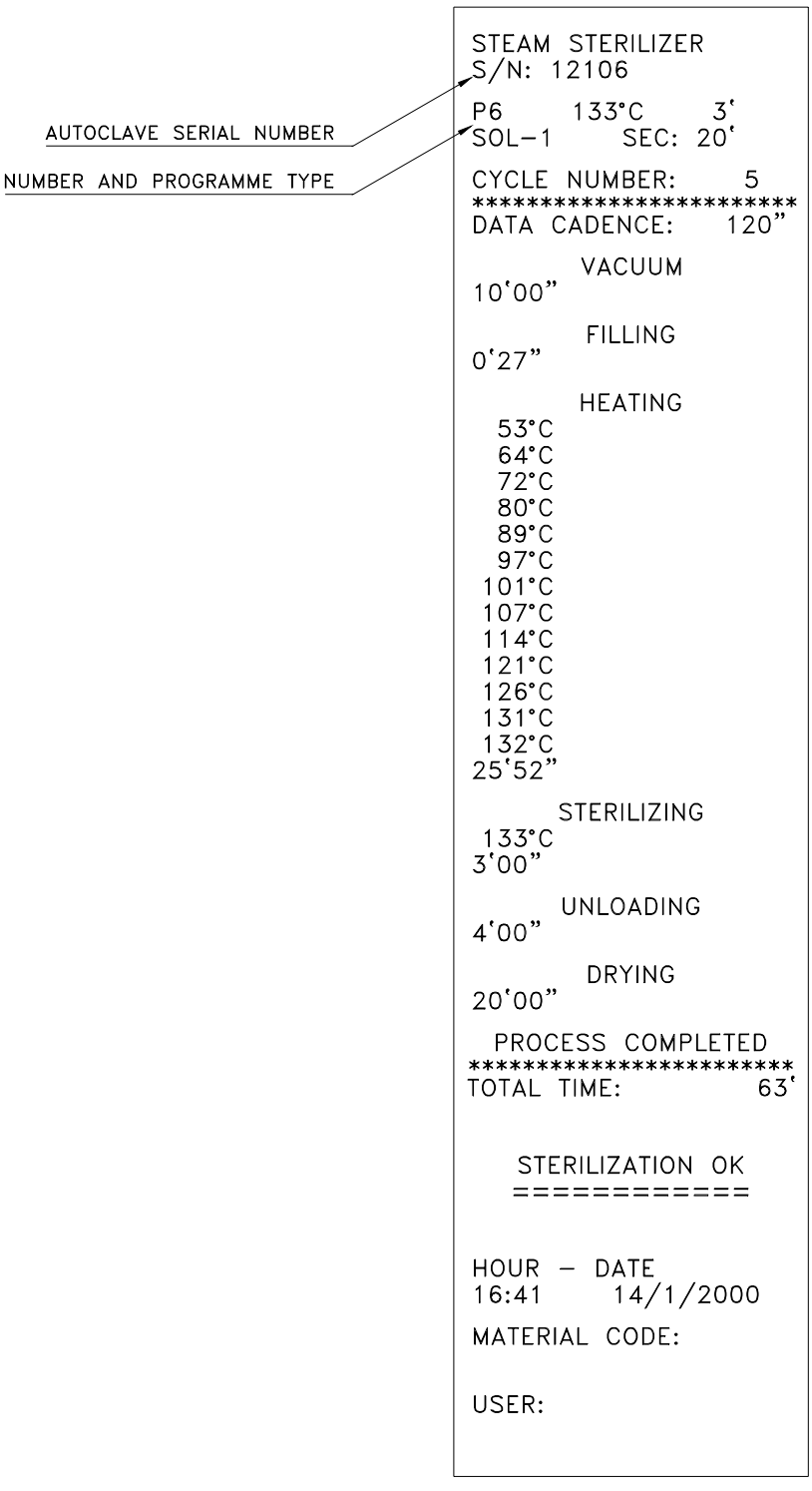
2.- Press switch nº (9) “INCREASE”, and in the screen will appear: “AUTOMATIC PRINTING”.

3.- Press switch nº (11) “PRO”, and in the screen will appear “DATA CADENCE”, this means that this will print data every 120 seconds. To modify the printing times press switches “INCREASE/DECREASE”.

4.- Press switch nº (11) “PRO”, in the screen will appear: “PRINT NOW?”. Press again switch nº (11) “PRO” and it will appear in initial screen.

With this mode of printer, every time the sterilization cycle is initialized, the printer, automatically will print data with a cadence of printing previously set by doing the following:

DATA PRINTING RESULTS



PROTECTED PROGRAMS (Info.)

The autoclave comes from the factory with 4 standard programs of sterilization, memorized in programs P0 to P3, and they are protected, that means impossibility to change them.

Otherwise, to have access an block and unblock the Nº of programs of our choice, we have to follow the next steps:

1.- Keep pressed the switch (7) “TEMPERATURE” during some seconds, in the screen will appear the message: “MANUAL PRINTING” and then the next 4 seconds will appear in the screen the message: “N.PROG.PROTEC. 4” that shows us that the 4 programs are protected.

2.- Pressing switches “INCREASE/DECREASE” to modify the nº of program that is suitable do be block or unblock.

0 = No program protected.

1 To 10 = Program to protect from P0 to P9.

3.- To exit the screen and validate the nº of programs protected press switch “PRO”.

⚠ NOTE: THIS INFORMATION IS CONVINIENT TO BE KNOWN BY AUTORIZED PERSONNEL ONLY.

WARNING MESSAGES

These messages will appear in the second line of the microprocessor screen. They only appear if there is a sterilization process going on.

LACK OF WATER

It is detected that the water of the condensed tank has reached its minimum level.

This message will not disappear until the maximum level would be replaced. Fill in with water just up to the point the message disappears. This will coincide with an acoustic signal.

PRINTING

This message will remain until the printing process is finished.

REPLACE FILTER

Remind you to change the bacteriologic filter. An acoustic signal will sound intermittently. To delete this message it must be stopped and started with the main switch (3).

WATER IN CHAMBER

The control detects the water inside the sterilization chamber, out of cycle. This message will be alternative with another: “START TO CONTINUE”, that shows the possibility to re-start the cycle again. This situation will take place after the execution of a program of liquids or when the cycle has been aborted in a step where the pressure was not enough to take out the water in a solid program.
It can also be a failure. (See FAILURE MESSAGES)

FAILURE MESSAGES

The failures detected during the sterilization process, a part from giving you the printing warning, are accompanied with the sound of an acoustic signal and the light of LCD. Pressing the switch “START/STOP”, the sound stops. When pressing the switch will disappear the failure warning message also, and the lights of the LCD., in case you don’t have to do a discharge phase (program LIQUIDS), if the cycle was in a determined phase, the control still consider to be pressure inside the autoclave, or the temperature is still high, in the case of liquid programs when the cooling process is finished or the discharge, the acoustic signal will sound.

FAULT PROBE 1

The control detects that the temperature probe 1 (main) is broken. It is impossible to proceed with the sterilization. If during the sterilization the probe is broken the process stops.

FAULT PROBE 2

The control detects that the probe 2 (heart probe) is broken during a sterilization process with two probes. If this happens during a cycle, the sterilization is aborted.
In this case it can be continued the sterilization while the probe 2 is changed, by editing the programs as SOL-1 and LIQ-1.

FAULT FILLING

When the filling phase is initialized, the control makes the autoclave fill in with water up to its level, by acting over the filling valve. The control takes the time to fill in the chamber.
If the autoclave is not filled within a determined time, or if it is observed a failure during this process, or also a failure at the level detector, the cycle is aborted.

FAULT HEATING

When a cycle of sterilization starts, the evolution of the temperature increase is being controlled up to the temperature selected. If the temperature does not evolute correctly, that means there must be a problem and the cycle is aborted.

FAULT TEMPERATURE

During the sterilization process the temperature must be between a scale of value to guarantee a correct sterilization., if this value is modified more than the setting one, the sterilization is not correct and the process is aborted.

ELECTRO CUTTING

By the way it is not a failure but an interruption of the sterilization cycle, because of an electrical cut. This will mean an abortion of the cycle.

WATER IN CHAMBER

If at the end of the sterilization process, the control detects water inside the autoclave, after the execution of a solids program.

LACK OF WATER

This message will not disappear until the autoclave has been filled up to its maximum level.

⚠ REPARATION AND SPARE PARTS

Before any reparation disconnect the apparatus from the mains.

Please get in touch with your distributor if in doubt.

For safety reasons and a good function of the apparatus use original spare parts only.

If spare parts are needed state the serial number and the model of the apparatus, indicated on the characteristic plate at the rear of the apparatus.

⚠ GUARANTEE

This apparatus is guaranteed for a one year period, against any fabrication failure or defective part. The guarantee does not cover any casualty produced by improper use of the apparatus or alien casualties to R.ESPINAR, S.L.

If the apparatus is manipulated by non-authorized personnel by R.ESPINAR, S.L., this guarantee is automatically expired.

R.Espinar S.L. reserves all right to change technical specifications, without previous notice.

DECLARATION OF CONFORMITY"CE"

The manufacturer: **R. Espinar, S.L.**

declare under its own responsibility that the apparatus: Autoclaves for sterilization, models: **AE-28-DRY, AE-75-DRY, AE-110-DRY, AND AE-150-DRY** (Cod.: 13360028, 13380075, 13400011, and 13420015)

fulfil with the directives of security: 73/23 CEE "Low Tension" and 89/336 CEE "Electromagnetic compatibility"

According to International Regulations:EN-61010-1, EN-61010-2-041, EN-50081-2 and EN-50082-1

R. Espinar

Manager-Director

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